

BRIEFING DOCUMENT:
UPDATE ON CHINOOK SALMON BYCATCH IN THE GROUND FISH FISHERIES
OF THE BERING SEA/ALEUTIAN ISLANDS AND GULF OF ALASKA

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Current Status of Chinook Bycatch in the Groundfish Fisheries of the Bering Sea/Aleutian Islands and the Gulf of Alaska

As of February 3, 1991 an estimated 20,708 chinooks had been caught incidentally in the groundfish fisheries of the Bering Sea/Aleutian Islands (BS/AI). An additional estimated 2,213 chinooks had been caught in the Gulf of Alaska groundfish fisheries, primarily in the midwater trawl fishery for pollock.

In the BS/AI, the vast majority of the bycatch has occurred in the pollock midwater trawl fishery, predominantly from federal statistical area 517 and, to a lesser extent, statistical area 515. The pollock fishery was initially concentrated in statistical area 517 and, during the last two weeks of January, expanded to include statistical area 515. As of February 3, the bycatch rates for these two areas were 0.325 and 0.013 chinooks/mt of groundfish, respectively. Federal statistical areas are indicated in Figure 1a.

In addition, preliminary data from groundfish vessels in the Donut Hole suggest bycatches of chinook salmon that could be in excess of 60,000 in 1990.

BS/AI Groundfish Catch and Chinook Bycatch: 1990 VS. 1991

This year, by January 27, both reported groundfish catch and reported chinook bycatch in statistical area 517 had increased dramatically compared to the same period in 1990. However, the observer program was newly established in 1990 and actual observer coverage was very minimal prior to March 1990. Therefore, it is possible that the actual chinook bycatch for the first month of 1990 in the entire Bering Sea was higher than the approximate 3,000 chinooks reported.

By January 27, reported groundfish catch and chinook bycatch for 1990 and 1991 in statistical area 517 of the BS/AI was:

<u>YEAR</u>	<u>GROUND FISH (MT)</u>	<u>CHINOOKS (NOS.)</u>	<u>BYCATCH RATE (NOS./MT)</u>
1990	7,657	383	0.05
1991	53,872	12,316	0.23

Cumulative bycatches of chinook salmon through the week ending February 3 are shown in Figure 1.

Commercial Catch History and Health of Chinook Salmon

The total statewide commercial harvest of chinook salmon has been relatively stable since the late 1980's. The projected total statewide commercial harvest for 1991 is 672 thousand chinook salmon (Geiger and Savikko, 1991). The total statewide harvest in 1990 was 665 thousand chinooks.

On the district level, the Bristol Bay chinook salmon stocks have suffered the greatest decline. Chinook salmon numbers have dropped since the early 1980's

raising concern over the health of the Nushagak and Togiak River runs. The number of chinook harvested in the Cordova district (Copper River) and the Cook Inlet district (Kenai River) have also declined since 1987. According to area management biologists, the Yukon and Kuskokwim stocks are currently in a rebuilding phase after lower-than-optimum returns in the mid-1980's.

The total annual commercial catch for districts or combined districts from the years 1980 - 1990 are provided in Figure 2. The total bycatches of salmon for each year are provided in this figure as well. The projected 1991 harvest by district, the 1980-1990 average, the 1990 catch, and comments are provided below:

Yukon/Kuskokwim	The 1991 projected harvest of 166 thousand chinook salmon is below the 1990 harvest of 190 thousand chinook salmon and below the 11 year average of 198 thousand fish. The 1990 catch was 95.7% of the 11 year average.
Bristol Bay	The 1990 harvest of 33 thousand chinook salmon was 28.0% of the 1980-90 average of 118 thousand fish. The projected 1991 harvest is 45 thousand fish, an increase from the 1990 catch. However, the chinook salmon catch in the Nushagak district has been in decline since 1984. There has been no directed commercial fishery for chinook salmon since 1986.
Ak Pen/Chignik	The eleven year average of 33 thousand chinook salmon is less than the 1990 catch of 35 thousand chinook. However, the 1991 projected harvest of 22 thousand fish is well below the average.
Kodiak	Although historically small, the commercial catch in Kodiak has risen from between 1 and 5 thousand chinook salmon during the period 1980-87, to 22 thousand in 1988 and 19 thousand in 1990. The 1991 projected harvest is 15 thousand fish.
Cook Inlet	Although high chinook harvests were reported in 1986 and 1987 (40 and 41 thousand fish, respectively), the 1990 harvest of 18 thousand chinook salmon was 75.9% of the eleven year average of 24 thousand fish. The 1991 projection is for 32 thousand chinook salmon.
Cordova	The 1990 harvest of 22 thousand chinook salmon was lower than the 1980-90 average of 34 thousand fish. However, the run is thought to be stable and the 1991 projected harvest is 42 thousand chinook salmon.

Origins of Chinook Salmon Caught Incidentally in Groundfish Fisheries

Information on the origins of chinook salmon caught incidentally in trawl and other fisheries of the Bering Sea comes primarily from salmon scale pattern analysis. The study most relevant to the groundfish fisheries is Myers and Rogers (1988). Scales collected by groundfish observers were analyzed to

identify the origin of chinook salmon bycaught in the foreign and joint-venture groundfish fisheries in the Bering Sea EEZ during 1979, 1981 and 1982. The percent origin of chinook salmon from various regions and within the Western Alaska region-over all three years was:

Western Alaska	60 %
Yukon	17 %*
Kuskokwim	24 %*
Bristol Bay	29 %*
Central Alaska	17 %
Asia	14 %
S.E. Alaska/British Columbia	9 %

* Not intended to sum to Western Alaska total percentage.

Myers and Rogers indicated that the predominant ages of chinook salmon in the western Alaska commercial catches were ages 1.3 (years in fresh water, years in salt water) and 1.4. They speculated that the greatest effect of large incidental catches of ages 1.2 and 1.3 chinooks offshore on inshore harvests would likely occur 1 or 2 years later.

Davis (1990) also used scale pattern analysis to determine origins of chinook salmon near Japanese mothership and landbased driftnet salmon fisheries in 1985 and 1986. Based on scales collected in the vicinity of the mothership fisheries (north of the Aleutians and between 175°E and 175°W) the percent origin of immature (age-1.2) chinook salmon was:

	<u>1985</u>	<u>1986</u>
Western Alaska	58 %	10 %
Central Alaska	3 %	17 %
Asia (Kamchatka)	39 %	73 %

A previous study of chinooks from the area of the Japanese mothership salmon fishery, 1975 to 1981 (Myers et al., 1987), indicated the following percentage origin of chinooks from the Bering Sea:

Western Alaska		70 %
- Yukon	48 %*	
Kuskokwim	21 %*	
Bristol Bay	14 %*	
Central Alaska		10 %
Asia		18 %
S.E. Alaska/British Columbia		2 %

* Not intended to sum to Western Alaska total percentage.

Davis (1990) cites additional scale pattern studies (Major et al. 1975, 1977a,b) which also indicated "that western Alaskan fish predominated in the Bering Sea and that the proportion of western Alaskan fish increased to the east".

Tagging data to determine region of chinook origin have been very limited but tend to corroborate results of scale pattern analyses (Myers and Rogers, 1988). Although scales from chinooks are currently being collected by observers, no scale pattern analysis is currently being conducted to determine the origin of chinook salmon bycaught in the groundfish fisheries. Observers are also collecting the heads of salmon with clipped adipose fins for potential recovery of coded wire tags.

Potential Future Chinook Bycatch

As of February 3, 59 % of the pollock roe season quota had been taken in the Bering Sea, 61 % of the Bogoslof management area (Figure 1a) quota had been taken and 18 % of the Aleutian Islands quota had been taken. At these rates of fishing, the Bering Sea and Bogoslof quotas will probably be attained near the end of February. Once the roe season pollock quota has been taken in the Bering Sea, it is expected that a large percentage of the fleet will shift to the Aleutians for what remains of a minimal quota on pollock, to bottom trawling for Pacific cod and other species, and to the Gulf of Alaska for pollock.

As of February 3, only 9 % of the Pacific cod quota in the BS/AI had been taken. In 1990, the chinook bycatch rate in the Pacific cod bottom trawl fishery (range: 0 - 0.043 chinooks/mt groundfish) exceeded the rate in the pollock midwater trawl fishery (range: 0 - 0.020 chinooks/mt groundfish) in eight of the ten management areas. The 1990 chinook bycatch rate in the Pacific cod trawl fishery in statistical area 517 (0.037 chinooks/mt groundfish) was over twice the corresponding rate in the pollock midwater trawl fishery in statistical area 517 (0.016 chinooks/mt groundfish). This suggests the possibility of continued high bycatch of chinook salmon even after the fleet shifts to fishing for Pacific cod and other species.

A shift of boats to the Gulf of Alaska could increase the bycatch of chinook salmon in the Gulf, where bycatch of chinooks exceeded that of the BS/AI in 1990 (see Figures 3 and 4). It should be emphasized that the early-year bycatch of chinooks in 1990 in the Bering Sea may have been similar to that reported for

January 1991, but may have been largely unreported due to the delays in implementing the observer program in 1990. Thus, the apparent increase in chinook bycatch in 1991 compared to 1990 may in part be an artifact of inadequate observer coverage in early 1990. Weekly and cumulative bycatches of chinook salmon for 1990 in the Bering Sea are shown in Figure 5. The same information for chinook salmon bycatch in the Gulf of Alaska is shown in Figure 6.

In addition to incidental catches of chinook in the groundfish fisheries of the U.S. EEZ, the bycatch of chinooks in the groundfish fisheries in the Donut Hole should be taken into account in evaluating the potential impact of bycatch on the directed catches of chinook salmon.

To fully understand the impact of chinook salmon bycatch on Alaskan salmon stocks will require a detailed analysis of the data provided by onboard observers. Additional information concerning the origin of the stocks of salmon being intercepted by the trawl fleet is also necessary to reveal specifically affected stocks. Scale pattern analysis, tag recovery, and genetic stock identification are means which can be incorporated to identify stock origins. Knowledge concerning the affect of chinook salmon bycatch on Alaskan stocks is especially necessary in the case of districts such as Bristol Bay, and perhaps Cook Inlet and the Copper River, which have experienced a significant drop in the numbers of returning fish in spite of adequate escapement.

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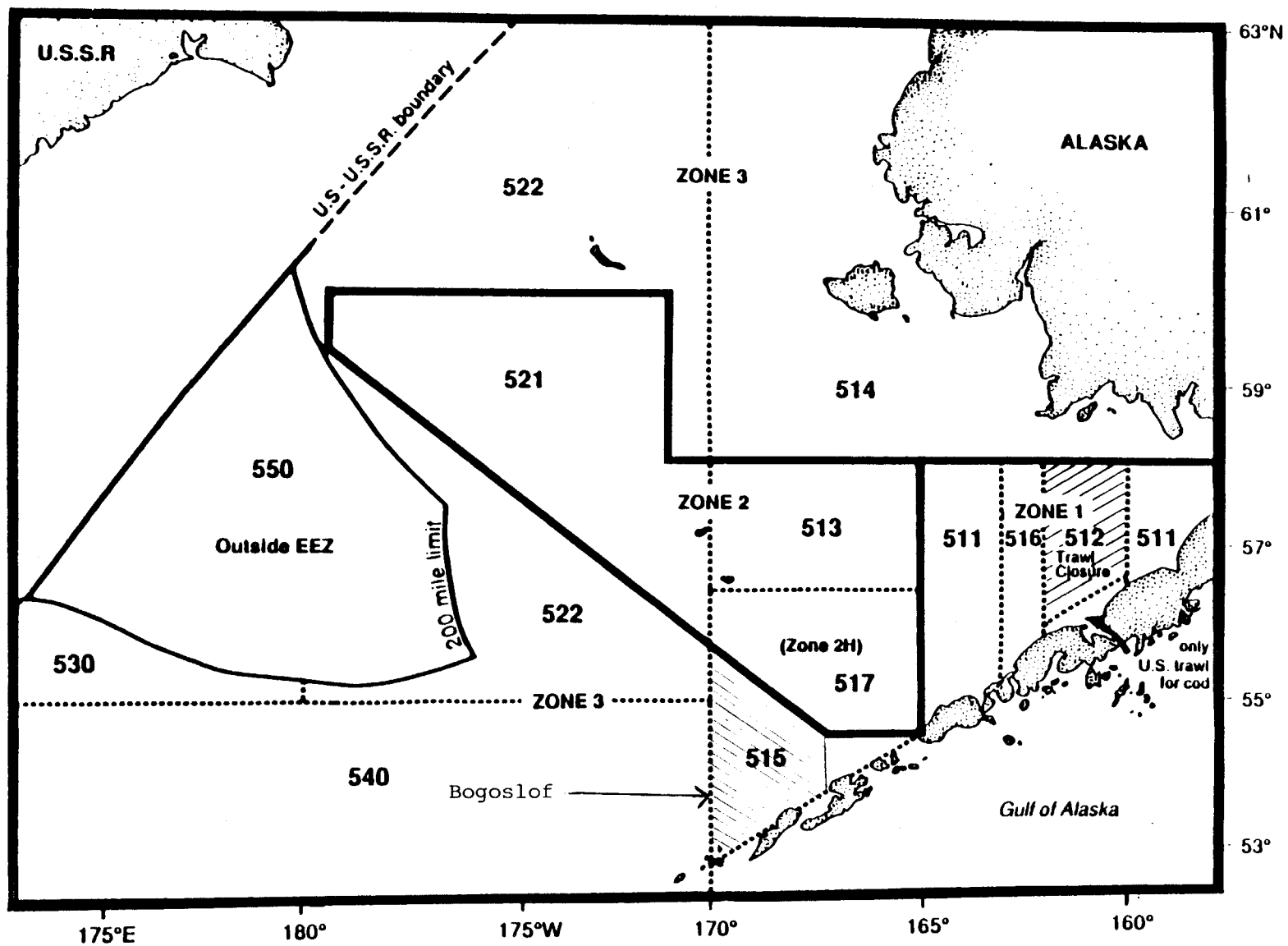


Figure 1a. Bering Sea federal statistical zones and areas (from: Guttormsen et.al.).

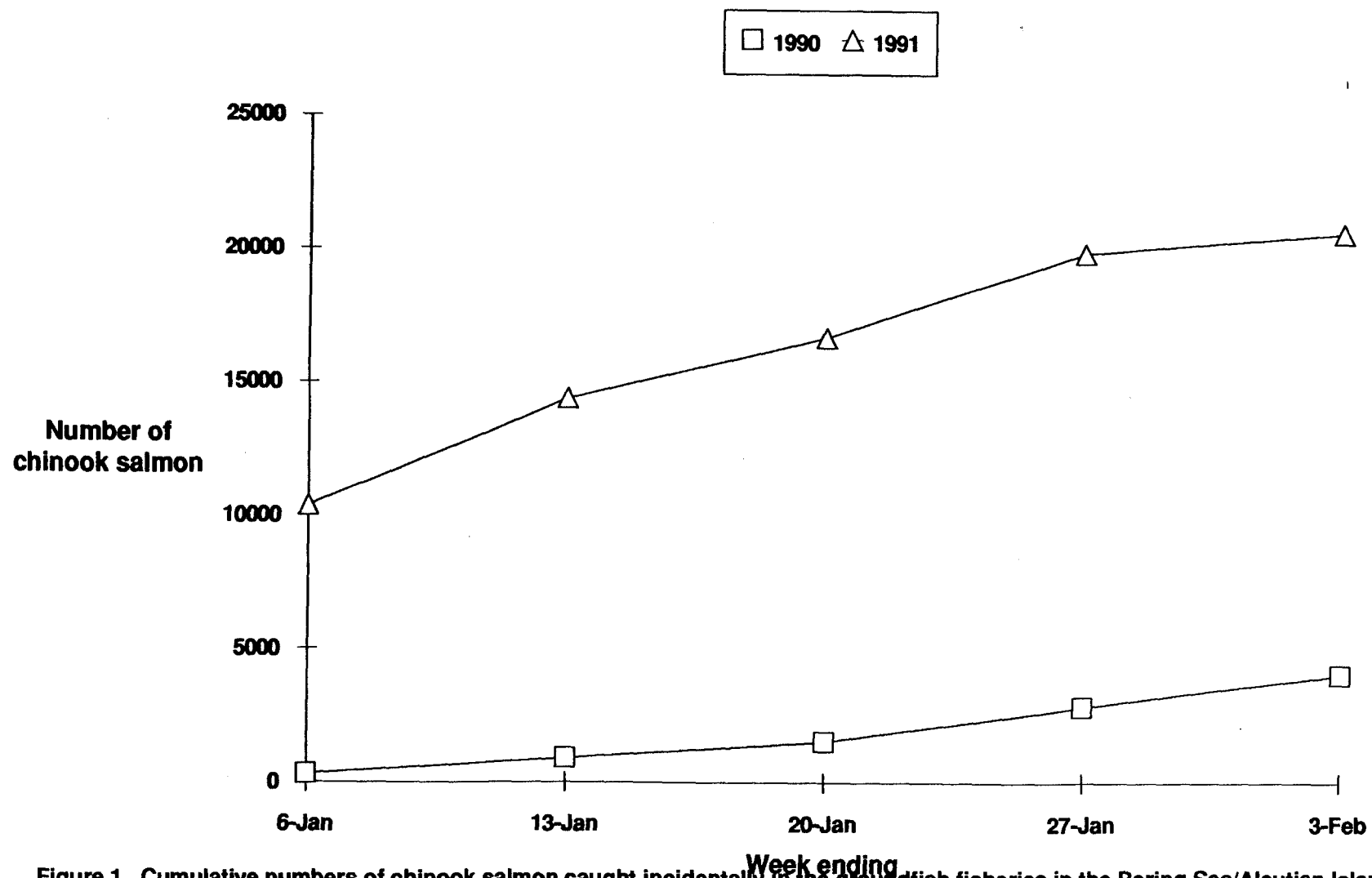


Figure 1. Cumulative numbers of chinook salmon caught incidentally in the groundfish fisheries in the Bering Sea/Aleutian Islands, 1990-1991.

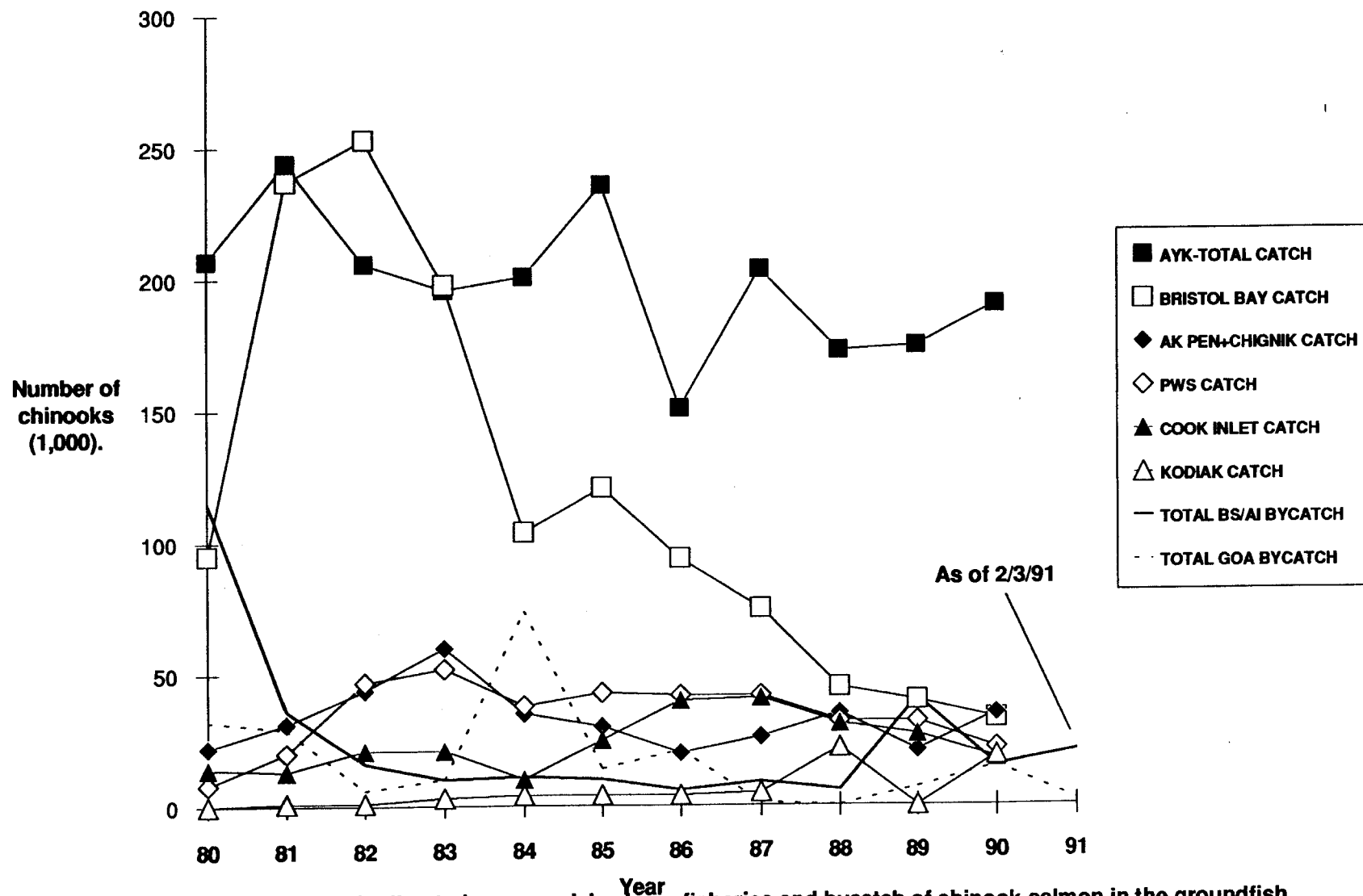


Figure 2. Catch of chinook salmon in directed commercial salmon fisheries and bycatch of chinook salmon in the groundfish fisheries in the Bering Sea/Aleutian Islands and Gulf of Alaska, 1980 - 1991.

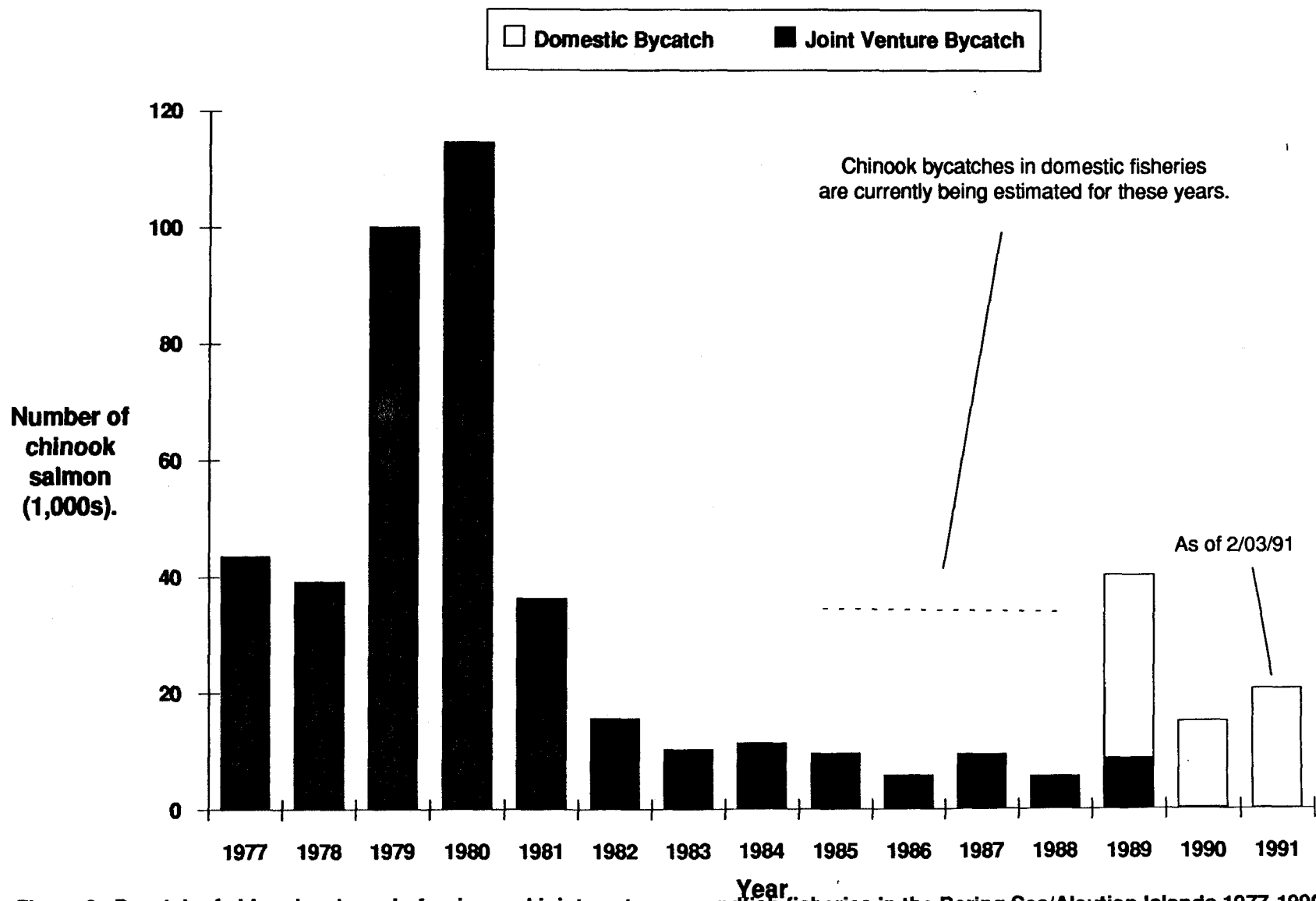


Figure 3. Bycatch of chinook salmon in foreign and joint venture groundfish fisheries in the Bering Sea/Aleutian Islands 1977-1990, and bycatch of chinook salmon in the domestic groundfish fisheries of the BS/AI, 1989-1991.

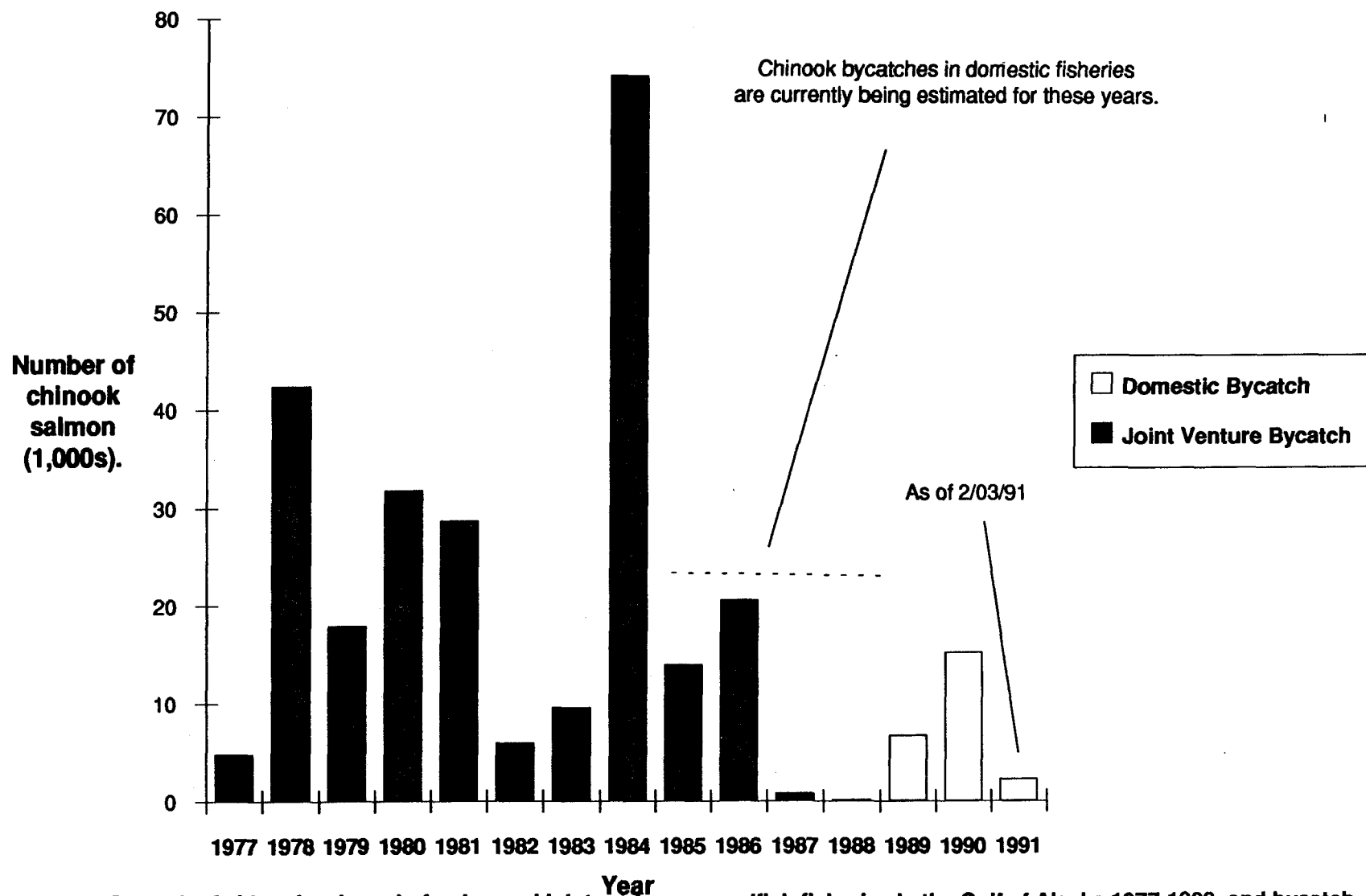


Figure 4. Bycatch of chinook salmon in foreign and joint venture groundfish fisheries in the Gulf of Alaska 1977-1988, and bycatch of chinook salmon in the domestic groundfish fisheries of the Gulf of Alaska, 1989-1991.

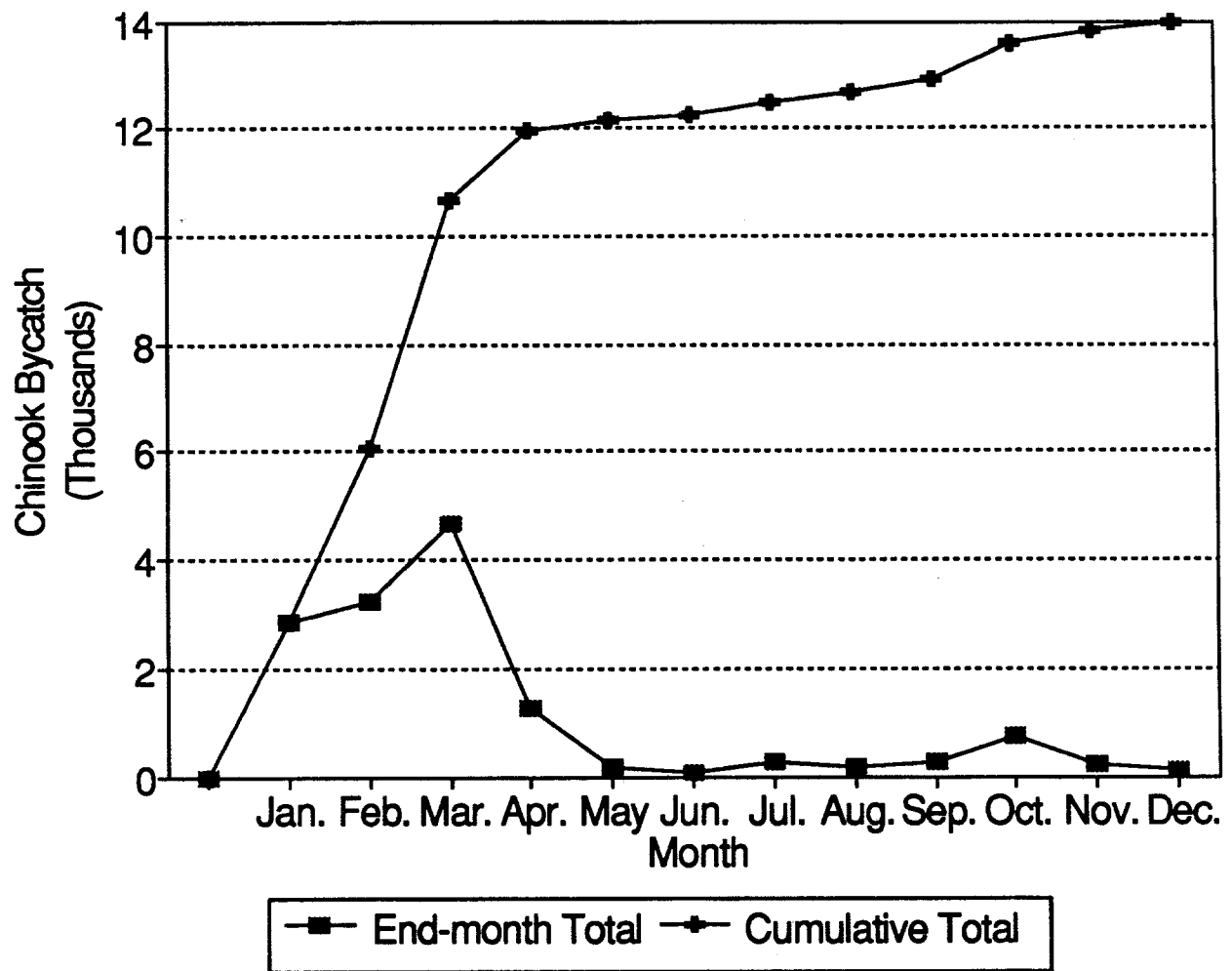


Figure 5. 1990 chinook salmon bycatch in the Bering Sea.

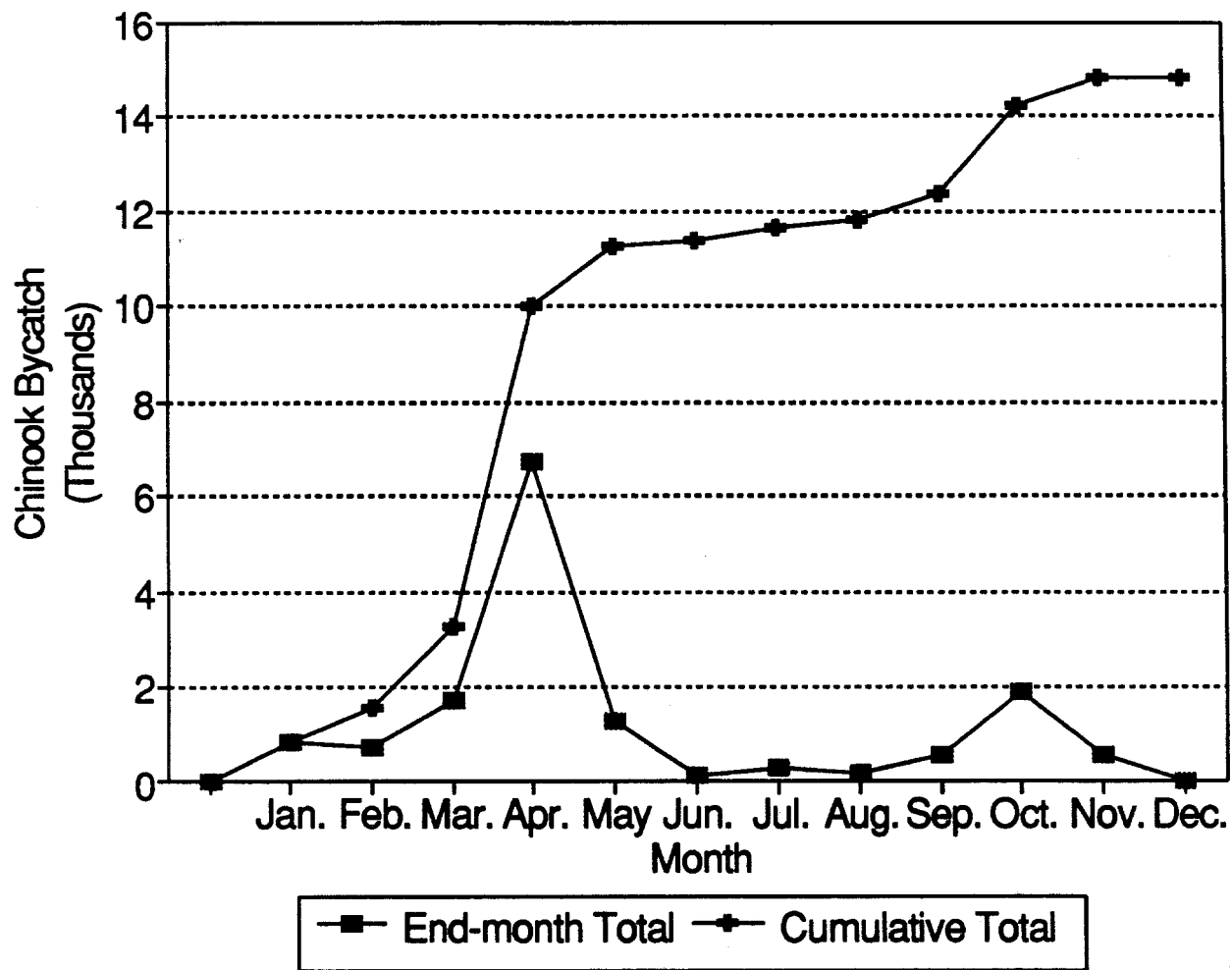


Figure 6. 1990 chinook salmon bycatch in the Gulf of Alaska.